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Dear Sir,

I think your method of preparing certain tinctures, as tincture of hemlock, by adding rectified spirit to the expressed juices of the plants, a great improvement on the ordinary method, and calculated to obtain uninjured the activity of the plants employed. The samples of the tinctures given by you to me are the best I have seen.

The process of the Edinburgh Pharmacopœia for 1839 for making tincture of hemlock, though an improvement on preceding methods, is inferior to yours in several respects. The percolation which is directed is unnecessary, and in your process is entirely dispensed with. The substitution of simple spirit for tincture of cardamoms, has the advantage of yielding a tincture, the active properties of which may be judged of by the colour, taste, and smell, and by the action of potash on the resulting compound.

Ever yours, &c. &c.

Jonathan Pereira.

Lecturer in the Medical School of the London Hospital,
and at the Aldersgate School of Medicine.

Mr. Edward Bentley.

No. IV.

GALVANIC TEST APPARATUS FOR ARSENIC.

The Thanks of the Society were presented to Mr. W. J. T. Morton, Royal Veterinary College, Camden Town, for the following Communication of his Method of Testing the Presence of Arsenic.

This apparatus has been invented with a view to obviate one of the objections raised against Marsh's mode of detecting arsenious acid in organic and other fluids; namely, that the zinc employed may contain arsenic.

In it the suspected fluid, slightly acidified with sulphuric acid, so as to render it a better conductor of electricity, is decomposed by the aid of a galvanic battery of a few plates, when, if any arsenic be present, it will be evolved at the negative electrode in combination with the hydrogen, forming *arseniuretted hydrogen gas,* which, being allowed to escape by turning the cock, is to be inflamed as it issues from the jet; and on bringing a watch-glass, or a piece of porcelain over the flame, a film of arsenicum will be deposited on it.

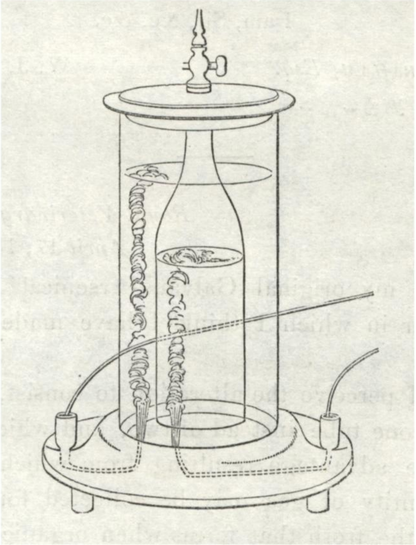
That it is arsenicum may be proved by dissolving it in excess of nitric acid, evaporating to dryness, and adding to the salt a solution of the nitrate of silver, when, according to Orfila, a brick-red precipitate will be thrown down—the arseniate of silver.

By this apparatus the existence of one grain of arsenious acid, when dissolved in a gallon of water, or of one part in above 76,000, has been demonstrated; many metallic films having been obtained; and there is little doubt but that the dilution might have been carried much further, and still the presence of the poison indicated.

W. J. T. Morton,
Lecturer on Veterinary Materia Medica,
Royal Veterinary College.

In the apparatus which Mr. Morton originally sent to the Society, the oxygen and hydrogen were collected in two tubes inserted in the wooden cover of the glass cylinder containing the liquid to be tested; each tube was furnished with a brass jet and stop-cock similarly to the single bell-mouthed tube in the annexed drawing. The lower and open ends of the tubes were placed over the electrode points of the wires connected with the mercury cups in the sides of the wooden stand; when the pole-wires of a galvanic battery are placed in the cups, a small quantity of sulphuric acid having been added to the liquid, the decomposition proceeds, and if any arsenic be present, it may be collected in the same manner as with Mr. Marsh's apparatus.

The following letters explain Mr. Morton's motives for altering his apparatus to the form represented by the drawing.



Royal Veterinary College,
Sir, *March 4th,* 1841.

I am obliged by your communication; and, if possible, I will attend on Saturday evening, as requested: but my object in sending the apparatus to the Society of Arts was merely to give publicity to that which I thought might prove of service, and which appears to merit your notice.

The battery I have employed is either a Wollaston's trough of ten plates, or a Smee's. I am now about to make such an alteration in the apparatus as will, I hope, do away with the necessity of using any acid, and thus to obviate the other objection that has been raised to Marsh's test; but I cannot as yet speak positively. I hope to have the new apparatus home to-morrow, and before Saturday to try it.

If I am unable to attend on Saturday evening, I will forward it to you, with a battery.

I am, Sir, &c. &c.

W. A. Graham, Esq. W. J. Morton.
Secretary, &c. &c.

Royal Veterinary College,
Sir, *April* 17, 1841.

I forward my original Galvano-Arsenical Apparatus, with another in which I think I have made some improvements.

You will perceive the alteration to consist, firstly, in having but one tube instead of two, and which is much larger. The advantage resulting from which is that a greater quantity of gas may be collected for examination, while the froth that forms when organic fluids are being operated upon falls more readily, and hence is less likely to interfere with the analysis. Secondly, the electricity enters by means of a number of pointed wires instead of pieces of platinum foil, by which the decomposition of the suspected fluid is more quickly effected.

The only care required on the part of the analyst is, that the negative electrode be connected with the gas receiver, otherwise the arseniuretted hydrogen that may be evolved will be lost. The oxygen may be allowed to escape.

It appears desirable that the aid of sulphuric acid as a conductor of electricity should be dispensed with, since much of that now met with in the market is contaminated with arsenic, from iron pyrites being used in its formation. I have been, therefore, extremely anxious to find a substitute; and although I have not discovered any agent that so readily causes the disengagement of minute quantities of arsenic as it, yet a small portion of pure potash, or its carbonate or nitrate, may be advantageously used instead. About two drachms to a pint I have found sufficient. The advantage is, the arseniate of potash formed is much more soluble than arsenious acid.

This being the case, the plan to be pursued in cases of suspected poisoning is rendered sufficiently simple. It is this; portions of the stomach that have been acted on, or the contents of that viscus, are to be boiled in distilled water for a short time, adding either some pure potash, or its carbonate. The solution is then to be tested by means of the galvano-arsenical apparatus, in the manner already shewn to the Committee.

Thus I have removed the objections that have been raised to nascent hydrogen as a test for arsenious acid, by not employing either zinc or sulphuric acid.

I am, Sir, &c. &c.

W. A. Graham, Esq. W. J. T. Morton.
Secretary, &c. &c.

In presenting Mr. Morton's method to the public, the Society recommend it as an ingenious and useful addition to the methods already in practice, and anticipate that it may frequently prove serviceable in corroborating the results of other experiments, if not in furnishing independent evidence.

It is, however, necessary to call attention to the fact, that according to the experiments of Mr. Thompson, the sulphurets of arsenic are unacted on by this method, unless dissolved in alkaline menstruum, and even then a large portion of the arsenic remains attached to the electrode in the form of a black powder (hydroguret of arsenic).